

Human-mammoth (*Mammuthus primigenius* Blumenbach) inter-relationships in the Palaeolithic of Siberia: a review of current knowledge

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Spatial-temporal features of human-mammoth interaction in Siberia are being reconstructed using archaeological, palaeontological, and radiocarbon (¹⁴C) data (*cf.* Tseitlin 1979; Derevianko, 1998; Kuzmin & Orlova 1998; Orlova *et al.*, 2000a, 2000b, *etc.*). Only sites with ¹⁴C age control are considered in this study. For the time interval *ca.* 18,000-12,000 BP, we selected 54 Upper Paleolithic sites (with 160 ¹⁴C dates) and 30 mammoth localities (with 60 ¹⁴C dates) (Orlova *et al.* 2000b) (Fig. 1). The sites are distributed across Siberia and the Russian Far East. The mammoth sites include several with mass accumulations of mammoth bones ("cemeteries"), close to Palaeolithic sites. Of these, the best-studied in terms of archaeology and palaeontology are Berelekh, Shestakovo, and Volchya Griva.

Berelekh (latitude 70°26' N, longitude 143°57' E), near the coast of the Arctic Ocean; has yielded numerous mammoth bones (from at least 140 individuals; Vereshchagin, Baryshnikov, 1982, 1984). A Palaeolithic site lies only a few hundred metres away (Mochanov & Fedoseeva, 1996). ¹⁴C dates on mammoth remains range from *ca.* 13,700 BP to *ca.* 10,400 BP, while ¹⁴C dates on wood from the nearby archaeological site are between *ca.* 13,400 BP and *ca.* 10,600 BP. Mammoth tusks were used as raw material for making knives,

spears, and scrapers, and some mammoth bones had been burned.

Shestakovo (55°54' N, 87°57' E), in southwestern Siberia, contains a mass accumulation of mammoth remains in Palaeolithic cultural layers (Derevianko *et al.* 2000; Zenin *et al.* 2000a). Many of the mammoth bones are burnt. ¹⁴C dates range from *ca.* 25,700 BP to *ca.* 18,000 BP (mammoth bones); *ca.* 24,600 BP to *ca.* 20,400 BP (horse and reindeer bones), and *ca.* 23,300 BP to *ca.* 20,800 BP (charcoal) (Derevianko *et al.* 2000; Zenin *et al.* 2000b). The variation in the dates suggests that humans scavenged sub-fossil mammoth bones, and used them for various purposes, such as tool making (including needles, awls, and anthropomorphic figurines) and also for fuel (Zenin *et al.* 2000a: 749-750). Both human and carnivore modification was observed on bones of various species. Taphonomic analysis makes it possible to identify significant contrasts in the degree of surface weathering between mammoth and other animal bones. In general, the mammoth bones are heavily weathered and very fragmentary, indicating that they had experienced a prolonged period of subaerial exposure.

Only a small proportion of these bones preserve clear carnivore marks. Much more of the mammoth material shows clear evidence of human modification, including burning, cut-

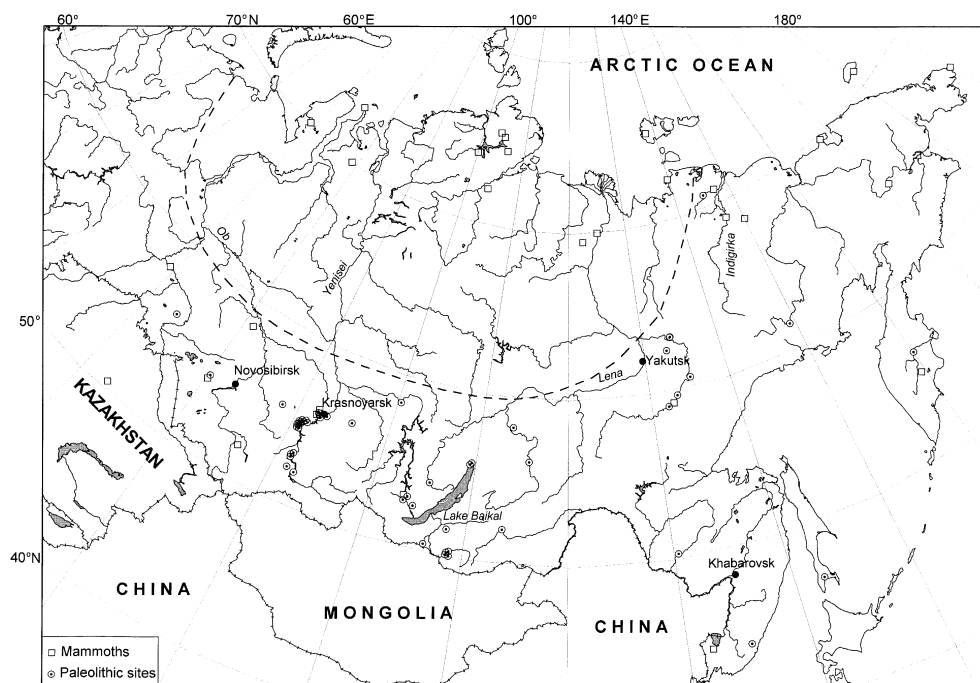


Fig. 1 - Radiocarbon-dated mammoths and Paleolithic sites in Northern Asia, 18,000-12,000 BP.

marks, percussion damage, and painting with red pigment. In contrast, the better surface preservation seen in material of other mammalian species (rhinoceros, horse, and reindeer) indicates much shorter surface exposure. It seems that the Shestakovo Palaeolithic humans may have scavenged mammoth bones from a nearby natural surface accumulation close to salt licks (Derevianko *et al.* 2000). Bones of other animals at this site were probably transported to the site from kills made elsewhere by human hunters.

Volchya Griva (*Wolf's Ridge*) (54°39' N, 80°15' E), also in southwestern Siberia, is an example of mammoth "cemetery", with a few stone tools and modified bones, including some that had been split, or polished, or painted with red pigment. ¹⁴C mammoth dates range from ca. 14,800 BP to ca. 11,100 BP (Orlova *et al.* this volume). Palaeolithic humans re-distributed mammoth bones in the site area, and created several spots with high bone concentration; however, no traces of artificial dwellings were found.

To model human-mammoth interaction, we choose the time interval ca. 18,000-12,000 BP. ¹⁴C-dated Paleolithic sites provide the most reliable evidence of human settling of the territory. From 18,000-12,000 BP, mammoth existed throughout Siberia and adjacent regions of Kazakhstan and Northeastern China (Fig. 1). From ca. 40,000 BP human groups gradually moved north from southern Siberia (Kuzmin, Tankersley, 1996; Orlova *et al.*, 2000a: 35). At ca. 24,000 BP, people had reached central Yakutia (Dyuktai culture; Kuzmin, Orlova, 1998: 35-39). After ca. 18,000 BP, several human groups migrated eastwards, and at ca. 14,000-13,300 BP colonized the interior Kolyma River basin (Siberdik site) and the Kamchatka Peninsula (Ushki group of sites). By ca. 12,300 BP, humans had reached the coast of the Arctic Ocean (Berelekh) (Kuzmin & Orlova 1998: 41-45; Goebel & Slobodin 1999). Thus, at ca. 12,000 BP only the northern parts of both Western and Eastern Siberia lay outside the northern limit of Palaeolithic occupation (dashed line on Fig. 1).

Analysis of the distribution of mammoths and humans in Siberia *ca.* 18,000-12,000 BP demonstrates that in several regions both coexisted for a long period of time. Although the area occupied by humans expanded from *ca.* 24,000 BP (Orlova *et al.* 2000: 33-35), mammoths continued to exist within the regions newly inhabited and explored by humans. This situation is evidenced not only by the presence of ^{14}C -dated mammoths and prehistoric sites in the same area (Fig. 1), but also the finding of mammoth bones, tusks, and teeth in the Upper Palaeolithic cultural layers. One of the most representative areas is in the middle part of the Yenisei River, southwest of Krasnoyarsk (Fig. 1), where a large proportion of Palaeolithic sites contains mammoth bones (at least 12 ^{14}C -dated sites) (Tseitlin 1979; Abramova *et al.* 1991; Derevianko *et al.* 1992; Lisitsyn 2000). In this area, the ^{14}C age of sites with mammoth bones ranges from *ca.* 24,900 BP to *ca.* 12,100 BP (bone and charcoal dates); with ^{14}C dates on mammoth material of *ca.* 20,100 BP to *ca.* 13,400 BP. So a 13,000 year overlap in human and mammoth presence did not result in extinction (and/or migration) of the latter.

Undoubtedly, mammoths were subject to human hunting, though it is difficult to assess the significance of this in the prehistoric economy. We note that human expansion in Siberia from *ca.* 24,000 BP, and especially across Northeastern Siberia after *ca.* 18,000 BP, did not cause a marked reduction of mammoth distribution. The drastic shrinkage of mammoth range occurred from *ca.* 12,000 BP (Sulerzhitsky 1997; Sher 1997; Kuzmin *et al.* 2000), both within and beyond the area occupied by Palaeolithic people. Thus, we have no evidence to suggest that human hunting pressure had a significant effect on Siberian mammoth populations.

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